

Trading firm wanted new strategies for portfolio optimization

A proprietary trading firm chose NAG software to create a new strategy for portfolio optimization. The client adopted NAG optimization solvers and used novel heuristics to enforce real-world constraints; the solvers were accessed using the NAG R package.

This mid size trading firm has used NAG consulting services, over a number of years, to develop portfolio management tools. They had a particularly difficult problem to address due to the structure of some real world constraints. The problem was exacerbated because, for legal and confidentiality reasons, the numerical model of the portfolio needed to be described without access to the actual core model.

NAG worked on techniques for mapping from the trading firm's domain, without uncovering its details, to another domain in which the new approach, using linear algebra, sorting, optimization, Cholesky factorization and other routines, could work effectively. NAG also helped to develop the details of the overall optimization strategy.

For the optimization a small set of well focused approaches were investigated. A number of initial approaches, including Nonlinear Programming (NLP) solver, turned out to be slow when applied to the specific problem type. Further investigation resulted in the use of a combination of a Quadratic Programming (QP) solver together with an NLP solver to greatly improve performance. Finally heuristics, drawn from recent past events, were also incorporated into the optimization process to manage the various constraints.

The resulting overall approach to optimization is working successfully and has made a significant difference to how the client manages their complex finance portfolios.

